

BLACK VERSUS WHITE WATERBIRD COLONIES (AVES) IN THE BOLIVIAN-BRAZILIAN PANTANAL

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ABSTRACT

White waterbirds form nest colonies in winter (July-September) with low water levels in the Bolivian-Brazilian "Pantanal", dark-colored species separate colonies earlier in the fall as waters recede. This phenomenon of white versus black "viveiros" (nurseries), which has entered into local folklore, is probably due to white nesting waterbirds using conspicuous plumage to locate others, fishing communally at drying pools in winter, while inconspicuous dark birds fish best separately in deeper receding waters or next to vegetation earlier in the fall.

KEYWORDS. Anhingas, colonial waterbirds, cormorants, herons, storks.

INTRODUCTION

In the swampy "Pantanal" along the Paraguay River in eastern Bolivia and the states of Mato Grosso and Mato Grosso do Sul, Brazil, herons and other waterbirds regularly form two types of colonies, which local residents call "viveiros pretos" [black nurseries or colonies] and "viveiros brancos" [white colonies] (YAMASHITA & VALLE, 1990). Black colonies include cormorants *Phalacrocorax brasilianus* (Gmelin, 1789), anhingas *Anhinga anhinga* (Linnaeus, 1766), and the dark-colored herons *Ardea cocoi* Linnaeus, 1766, and *Nycticorax nycticorax* (Linnaeus, 1758). White colonies are of spoonbills *Platalea aiaia* Linnaeus, 1758, storks *Mycteria americana* Linnaeus, 1758, and egrets *Egretta alba* (Linnaeus, 1758). Here I propose an ecological explanation for this phenomenon, which is so frequent as to have entered into the local vocabulary.

RESULTS AND DISCUSSION

As detailed by YAMASHITA & VALLE (1990), black colonies form early, April-August, as floodwaters start receding from wide swamps along the river. White colonies form later, June-October, at the yearly low point of flooding. It

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seems likely that colony timing in the Pantanal is related to well-known color-linked foraging specializations in colonial waterbirds, namely that white birds attract others to dense fish populations in drying pools in the open, while dark species either forage in deeper water or next to vegetation (KUSHLAN, 1977).

Colonial waterbirds tend to nest at a time of year of prey abundance, as do most species of birds. Most of the above Pantanal species eat fish, which are common all year in tropical regions. Indeed, it has been suggested (REICHHOLF, 1975) that the contrast between heron and stork abundance and rarity of ducks and geese (Anatidae) in the tropics is due to the fact that ectothermic fish eat the water vegetation that endothermic anatids eat in more temperate zones. While this shift could also be caused by greater nest predation on noncolonial anatids in the tropics, fish are certainly numerous in summer months in the Pantanal, but would be scattered and relatively unavailable to colonial waterbirds.

At any rate, few waterbirds nest in the summer in this region. As floodwaters recede, fish are concentrated and become more available to birds, especially as the last pools of water dry up one after another in winter months from July on. In these months, as tourists know well, thousands of waterbirds flock to the pools, notably conspicuous white or pink species.

Flocks of white waterbirds at drying pools are well known over the world. *M. americana* is known (KAHL, 1964) to benefit from group activity at pools, where many feet stir the mud and water into a soupy broth and fish dash blindly about, touching the sensitive bare heads or bills of the storks and being captured by rapid bill-snap reflexes. Various egrets and spoonbills join in the activity, flying together with the storks to a new pool after exhausting the fishes in the first one. Tests show that waterbirds are attracted to white models (KUSHLAN, 1976).

It is commonly suggested that white colors arise specifically to facilitate grouping at abundant sources of food, perhaps to confuse raptors or other predators, confuse fish or other prey, aid kin birds, or attract future mates or colonial companions. White color could be less conspicuous to certain fish in open water, but this seems less likely here than on the open ocean; inland cormorants are mostly dark, but fish in open water. White or pink plumage is also conspicuous to any predator, but less dangerous at drying pools fairly far from vegetation than it would be next to vegetation.

In the Florida Everglades, often considered a southern nearctic counterpart of the Pantanal, dark-colored waterbirds often are present at drying pools, but leave when the pools dry to the point that flocks of white species move in (KUSHLAN, 1976). Thus, availability of food to a dark-colored waterbirds is likely to be reduced by white competitors at the peak months of drying, while in floodwater months fish are at first too rare and later too scattered to provide much food for colonies.

Dark colonial freshwater birds in the Pantanal and elsewhere in the tropics fish in relatively open water (cormorants) or along the edges of vegetation (anhingas, herons). White color in these places could scare off fish or give them the impression of an open or hot site to be avoided; some herons shade an area with outspread wings to attract fish.

In the Pantanal, one would thus expect dark waterbirds to nest April-

August as floodwaters are receding, with water deep and next to border vegetation, but concentrating new generations of fish to some extent. White species nest later, at the months of their separate but similar peaks of food availability.

It seems likely that the black versus white colony phenomenon is not restricted to the Mato Grosso Pantanal, although this may be one of the few places where it is so regular and conspicuous as to have entered into local lore. NOVAES (1974) records large young already in July in northeastern Brazil for *Anhinga anhinga* and *Ardea cocoi*, with *Egretta alba* still in the middle of nesting. Where winters are too cool to dry up river systems, colonial waterbirds have to nest in the summer, and the black/white phenomenon might be less noted, although *N. nycticorax* is an early nester almost everywhere.

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